

Advantageously, errors can also be detected which result in an increase or a decrease of the torque, such as errors which call moment waviness in the driving moment. This is of great importance particularly in systems with a tactile interface with the operator, for example, an electronic servo steering system or steer-by-wire systems with a manual moment adjustor.

Claims

1. Method for braking or stopping an electromotor which can be driven by a direct current, particularly a brushless direct current motor, in the case of the presence of an error of the electromotor or units connected therewith,

characterized in that the presence of definite error states is verified, and the electromotor is braked, by carrying out, at least temporarily, a control of the electromotor which is adapted to the detected, definite error state, taking into account a maximum loading capacity of one of the electronic control units connected to the electromotor.

2. Method according to Claim 1,

characterized in that a verification is carried out to determine whether a control current or control currents applied to the electromotor, preferably an electronically commutated direct current motor with a PWM regulation, is/are determinable,

and, in case the control current or control currents was (were) determined, the electromotor is braked, by producing, at least temporarily in at least one motor phase, a current-regulated short circuit, particularly by the application of a current indicator via a PWM on an electronically commutated direct current motor,

and, in case the control current or control currents is/are not detectable, the electromotor is braked, by producing, at least temporarily in at least one motor phase, a short circuit as a function of rpm or under time control.

3. Method according to Claim 1 or 2,

characterized in that a verification is carried out to determine whether a current rpm of the electromotor, preferably of an electronically commutated direct current motor with a PWM regulation, is detectable,

and, in case the current rpm was determined, the electromotor is braked, by producing, at least temporarily in at least one motor phase, an rpm-dependent short circuit as a function of the current rpm, particularly by the application of a voltage indicator via a PWM in an electronically commutated direct current motor,

and, in case the current rpm is not detectable, the electromotor is braked, by producing, at least temporarily in at least one motor phase, a short circuit, under time control.

4. Method according to one of Claims 1-3,

characterized in that a verification is carried out to determine whether, at the time when the error occurred, an rpm of the electromotor, preferably an electrically commutated direct current motor with a PWM regulation, is detectable,

and, in case the rpm was determined at the time when the error occurred, the electromotor is braked, by producing, at least temporarily in at least one motor phase, a short circuit, under time control, as a function of the rpm at the time when the error occurred, particularly with the application of a voltage indicator via a PWM in an electronically commutated direct current motor,

and, in case the rpm at the time when the error occurred is not detectable, the electromotor is braked, by producing, at least temporarily in at least one motor phase, a short circuit, under time control, as a function of a maximum rpm of the electromotor, particularly

with the application of the voltage indicator via a PWM in an electronically commutated direct current motor.

5. Electrical drive for a superposition steering for a motor vehicle or for an electromechanical brake (EMB), which presents an electromotor which can be operated with a direct current, particularly a brushless direct current motor, an electronic control and regulation unit and a power electronics unit for controlling the electromotor,

characterized in that the electronic control and regulation unit presents a detection means, for detecting an error of the electromotor and/or an electronic unit connected to the latter, and the electronic control and regulation unit presents braking and stopping means, for braking the electromotor, when the detection means detected an error, in which the braking and stopping means cause the power electronics, at least temporarily in at least one motor phase, to produce a short circuit as a function of the recognized, definite error state, taking into account a maximum loading capacity of the power electronics.

6. Electrical drive according to Claim 5,

characterized in that the electromotor is an electronically commutated direct current motor, and the electronic control and regulation unit presents a PWM regulation for the direct current motor, the detection means present a control current detection for detecting the control current or control currents applied to the direct current motor,

and, in case the detection means detects an error and a control current or control currents is/are determinable, the direct current motor is braked, by the fact that the stopping and controlling means cause the power electronics, at least temporarily in at least one motor phase, to produce a current-regulated short circuit as a function of the determined control current or control currents, particularly by the application of a current indicator via the PWM,

and, in case the detection means detects an error, and if no control current or control currents is/are determinable, the electromotor is braked, by producing, at least temporarily in at least one motor phase, an rpm-dependent short circuit as a function of the direct current motor rpm or under time control.

7. Electrical drive according to Claim 5 or 6,

characterized in that the electromotor is an electronically commutated direct current motor, and the electronic control and regulation unit presents a PWM regulation for the direct current motor, the detection means present a motor rpm detection, for detecting the current rpm of the direct current motor,

the direct current motor is braked, by the fact the holding and controlling means cause the power electronics to produce, at least temporarily in at least one motor phase, an rpm-dependent short circuit as a function of the current rpm, particularly by the application of a voltage indicator via the PWM,

and, in case the detection means detects an error and no current motor rpm is detectable, the electromotor is braked by producing, at least temporarily in at least one motor phase, a short circuit, under time control.

8. Electrical drive according to one of Claims 5-7,

characterized in that the electromotor is an electronically commutated direct current motor, and the electronic control and regulation unit presents a PWM regulation for the direct current motor, the detection means present a motor rpm detection for detecting the rpm of the direct current motor at the time when the error occurred,

the direct current motor is braked, by the fact that the stopping and controlling means cause the power electronics to generate, at least temporarily in at least one motor phase, a short